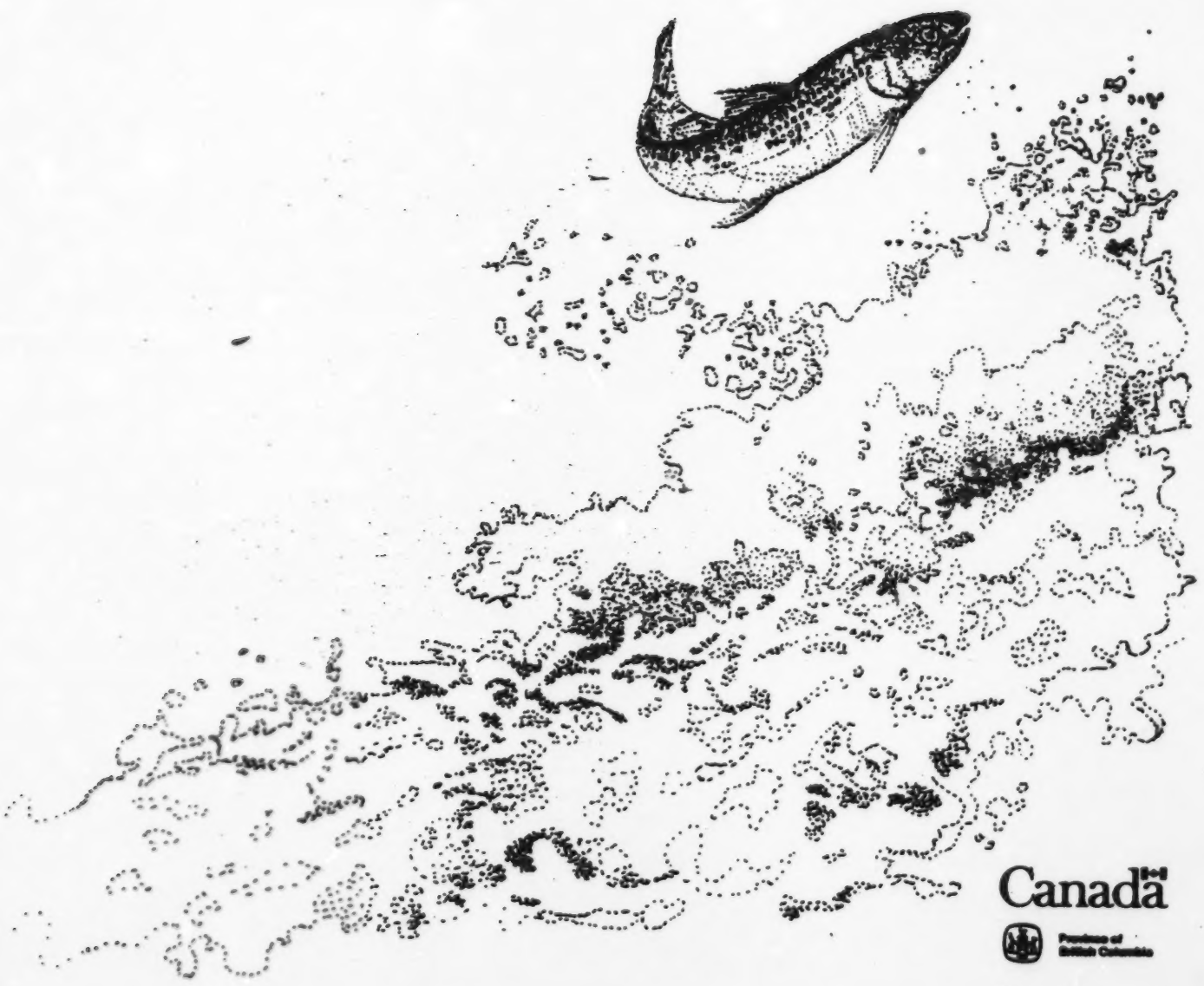
1982 Annual Report Summary

Salmonid Enhancement Program



Canada

Province of British Columbia

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Fisheries and Oceans Pêches et Océans

Province of British Columbia
Ministry of Environment

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Director's report

One of the most rewarding aspects of 1982 is that the early years of enhancement started to provide benefits through fish production. This year was the sixth of the seven-year Phase I of the Salmonid Enhancement Program (SEP).

Adult fish from SEP facilities are appearing in the commercial, sport and native food fisheries in increasing numbers. Preliminary analyses indicate that projects undertaken since 1977 have contributed a total 1,180,000 adults to the Canadian commercial and sport fisheries from 1977 to 1982 inclusive. Additional benefits will be forthcoming when the Program reaches operating capacity next year. Our major producer has been lake enrichment (for sockeye), followed by coho and chinook production from hatchery facilities.

Facilities built prior to SEP, many operating at full capacity, added another 2,730,600 salmonids of all species to the Canadian commercial and sport fisheries over the 1975-1982 catch years.

Major construction is drawing to a close. Kitimat hatchery, the most complex hatchery to be built during SEP, is nearing completion. Tenderfoot hatchery was expanded in 1982, and the $6.7 million Chehalis hatchery was completed in time for the fall egg-take.

The Job Creation program, initiated in June 1982, caused us to scramble to bring on-line several short-term projects we had on the drawing board. In all, 120 projects were completed by the end of March 1983. These projects not only created employment, they also were valuable to the Program, which would not have undertaken them without this extra funding.

One of SEP's major strengths is its planning capability, and this was rigorously tested throughout 1982. A tremendous amount of time was spent planning, which led to several alternatives for the future of SEP. These were presented to the federal government in early 1983.

The report of the Pearse Commission on Pacific Fisheries Policy was released in September 1982. Dr. Pearse supported the Program, and also made several recommendations. Some of the key recommendations were: that SEP should ensure that enhancement efforts were better integrated with overall fisheries management objectives; that more complete evaluation of SEP projects should precede further investment; and that the socially-oriented aspects of the Program should continue. The impact of these recommendations is seen in the Transition Plan.

This year really was a pivotal one for the Salmonid Enhancement Program. We were nearing the end of Phase I, planning the Transition Phase and Phase II.

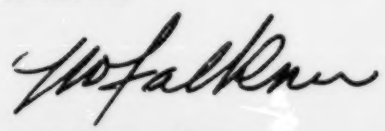
Two valuable advisory groups helped in this process: the Salmonid Enhancement Board and the Salmonid Enhancement Task Group. The Board is the primary advisory body for SEP. Composed of a majority of private sector members and a minority of government members, it is chaired by the Deputy Minister and advises the Minister of Fisheries and Oceans on SEP. The Task Group, in turn, advises the Board. It is composed entirely of representatives of various user and interest groups from around the province. This 19-member body conveys to the Board the public's wishes about the Program.

Phase I also has significant impacts on job creation and employment. About 8,900 person-years of employment will be created over a 30-year period from 1977 in the construction, operation, and maintenance of SEP facilities. And for every job created on enhancement projects, three or more are created in the fishing industry. Indirectly attributable to SEP is the employment created in industries that supply goods and services to SEP projects and to commercial fishermen and processors. The spending of incomes earned in both direct and indirect SEP-related employment will stimulate further economic activity and job creation.

SEP benefits native Indians in B.C. in several ways. Enhanced salmon production generates additional income and employment for native Indians in the commercial harvesting and processing sectors. The Community Economic Development Program creates full-time permanent employment in small projects that are built, operated and managed by native people. SEP production also contributes significantly to the improvement of catches in the native food fishery.

Next year, 1983, is the last year of Phase I. In 1983 and in the following two years, called the Transition Phase, we will be working hard to secure the future of SEP.

Going into the last year of Phase I of SEP, I would like to extend my thanks to all the members of the SEP team — federal and provincial SEP staff, the thousands of volunteers and our contractors — for their efforts in making this program the success it is.



N. W. Falkner, Ph.D.
Director, SEP

Matching performance with goals

One of the important goals established for SEP was to contribute to the economic well-being of society. This is measured by determining if the benefits to society exceed the costs of the Program. It turns out that Phase I of SEP has been highly successful, especially when account is taken of the erosion of its financial base by inflation and the extension of its term by two years without additional funding. Table 1 (page 12) shows SEP expenditures by program area.

Significant production capacity has already been completed, and it is projected that 85 percent of target capacity will be achieved by the completion of Phase I. With a benefit/cost ratio of 1.4:1, the Program has produced over $130 million of net economic benefits, 40 percent greater than the costs of the Program to date.

Regional development

The Regional Development account was established to measure the benefits from enhancement in areas outside the Lower Mainland and southern Vancouver Island. The goal was to provide $200 million in benefits to these target areas. Based on projections of total catch from Phase I production and its distribution by gear type and processing region, benefits accruing to the less-developed regions are estimated to be approximately $99.1 million.

The $99.1 million in benefits is comprised of fishing income, workers' wages in the processing sector, net corporate income, and operations and maintenance wages.

Native people

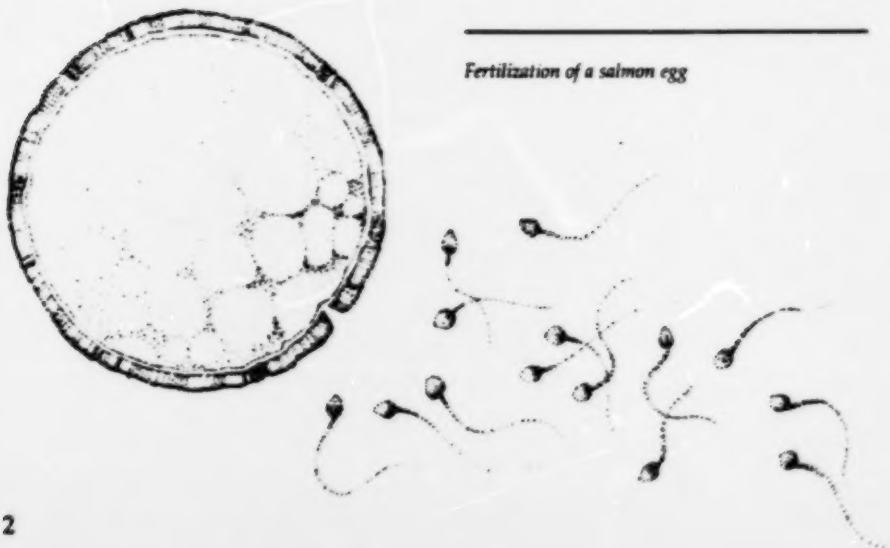
The commercial fishing industry is the most important source of income and employment for B.C. Indian people, and any program designed to strengthen this industry will have significant positive impacts upon native people.

Total native employment in the harvesting sector due to increased fish production is projected to be 55 person-years in the peak year, 1995, at which time 96 person-years of employment will be generated in the processing sector.

Phase I of SEP not only generates income and employment for native people in the harvesting and processing sectors, it also means direct employment in the construction and operation of SEP facilities.

To date, native involvement in the construction and operation of large scale facilities has been minimal due to several factors. First, almost all of SEP's construction activity is done under a competitive bidding process, with the contract awarded to the lowest bidder. The successful contractors have not employed significant numbers of native people. Secondly, native employment in government has been hampered by hiring regulations and the competitive bidding process, which stipulate that current employees be given the first opportunity for government jobs.

To overcome some of these difficulties, twenty-two affirmative action projects have been launched. In most cases, the projects are initiated and managed by native people. Funding comes from SEP and other federal government agencies. Taken together, the program, called the Community Economic Development Program (CEDP) has proven to be a highly



Fertilization of a salmon egg

successful native economic development program.

An assessment of CEDP by A. D. Rank states that for the period 1977 to 1982, CEDP generated employment totalling 266 person-years (85 percent of all of SEP's contract employment) for native Indians. The majority of this employment consists of continuing, full-time jobs. With unemployment among the native bands ranging from 40 percent to 80 percent, this program generates a high proportion of net new employment.

Employment

Employment attributable to SEP includes construction and operation of enhancement facilities, employment generated in the harvesting sector and incremental employment in the processing sector.

SEP should generate about 29,000 person-years of employment over a 30-year period. About 8,900 of those will be related to the construction, operation and maintenance of SEP facilities. Another 11,700 will be found in the harvesting sector and the remaining 8,400 in processing the enhanced catch. Looked at another way, for every job created directly on enhancement projects, three jobs are created in the fishing industry.

Environmental preservation

The investment in SEP shows the federal commitment to the preservation of salmonid stocks and their habitats.

This commitment is visible in habitat improvement projects, restoration of local streams and improvement of small local salmonid stocks. In addition, major capital projects have been designed to complement the natural environment and to assist small, ecologically important stocks as well as the larger, economically viable ones.

Fish production

By March 1983, completed facilities and existing enhancement projects, including lake enrichment, side channel development, fishways and small projects, had the potential, when operating at capacity, to contribute 39.5 million pounds (17.9 million kilograms) to the Canadian catch (Table 2, p. 12). Current estimates for total annual production of the completed Phase I program are approximately 43 million pounds (19.5 million kilograms).

The dynamic nature of the enhancement process is reflected in Figure 1, which shows that some fish production targets have been exceeded while others have not been met.

Expectations for sockeye and steelhead have doubled due to the success of lake enrichment and steelhead fry stocking programs. Achieved production for other species is reduced, largely due to reduced purchasing power for the Program when compared to original targets.

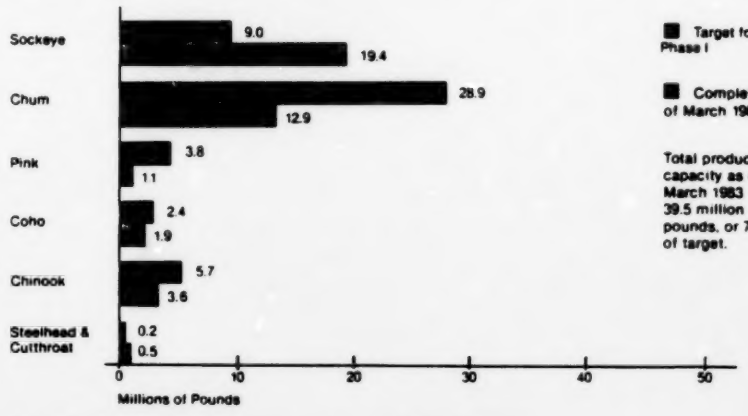
The variables which affect SEP's fish production are found both within and outside the Program. In lake enrichment, for example, the network of lakes undergoing treatment varies from year to year. On a departmental level, the priorities of fisheries management come into play. Special emphasis has been placed on chinook conservation and enhancement. International agreements and interceptions are taken into consideration.

In addition to these factors, a myriad of considerations enters into planning and projecting salmonid production performance.

Each summer, SEP undertakes a rigorous review and planning process. Strategies, both immediate and future, are established for each project. Several factors are considered: intra- and interspecies interaction, preservation of unique stocks through techniques like satelliting and strategies related to water quality, fish health, rearing and time-of-release. As well, the accumulating evidence of hatchery returns and experience from pilot facilities aid in the planning process.

SEP is a very complex program because it involves not only biological and technical factors, but also social and economic ones. In short, SEP uses the vehicle of fish production to produce economic and social benefits for the people of Canada. SEP's achievement will be measured in terms of those benefits.

Figure 1: SEP Production Capacity by Species: Phase I Targets and Performance to Date*



* Production capacity measures the capacity of facilities which have been constructed since 1977 (SEP facilities only) and are now operational. The capacity is stated in terms of expected future adult catches, using current facility capacities, current expected egg to adult survival rates of enhancement techniques, and projected future Canadian catch rates.

SEP facilities: major contributors

The juveniles released in the early years of the Salmonid Enhancement Program are now being caught in the commercial, sport and native food fisheries. Although hatcheries and spawning channels built prior to SEP have been contributing to these fisheries for years, it is still gratifying to see the SEP facilities begin to pull their weight. The life cycles of the various species of salmon, plus the length of time required to plan, design and build an enhancement facility mean that it is five years or more before a facility can start to make a contribution in terms of adult fish.

Adult returns

Because of its very successful hatchery, Robertson Creek is now the major chinook producer in B.C. The local sport and commercial catches plus the escapement amount to more than 100,000 fish. Not included in this number are the Robertson Creek chinook caught in fisheries on the west coast of Vancouver Island and in southeast Alaska.

Little Qualicum and Chemainus Rivers saw their first enhanced fish returns, and these resulted in escapements exceeding historical records.

On the down side, chinook escapements to Big Qualicum, Capilano, Puntledge and Quinsam hatcheries were less than anticipated; however, these runs are significantly larger than preenhancement levels and comprise mostly hatchery production.

Coho escapements to the major hatcheries were about average, indicating that ocean survival (smol to adult) is continuing at high levels

The catch plus escapement of Big Qualicum chum salmon was 300,000, the highest in ten years. Other chum producers — Tlupana, Inch, Pallant, Snootli Creek and Little Qualicum — produced at average rates or below.

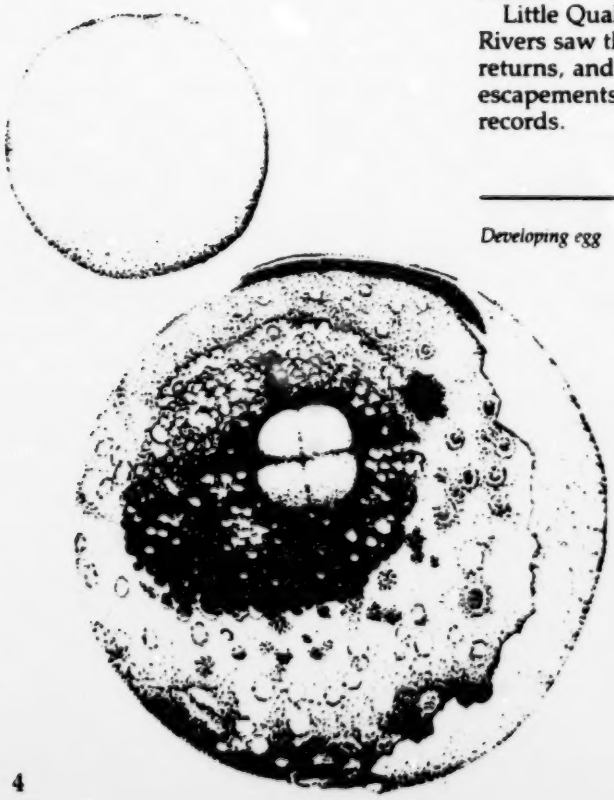
Fulton and Pinkut spawning channels again contributed heavily to the Skeena fisheries. The catch attributable to these facilities probably exceeded 1,000,000 sockey and the escapement was more than 550,000 fish.

Pink salmon enhancement is still in the experimental stage. Returns from experimental releases at Bear, Quinsam and Puntledge hatcheries were very poor, as were returns of wild pink stocks in this region. However, the Kakweiken fishway is the major success story for this species. Catches and escapements i odd years (the dominant cycle year) have increased since the fishway was installed in 1979.

Fish releases

Juvenile fish releases (Table 3) from major facilities increased for al species except chinook.

Babine sockeye fry production (from Fulton and Pinkut spawning channels) accounted for most of the



Developing egg

increase. Sockeye output from these two facilities reached a record 237 million, surpassing the previous high of 229 million set in 1977.

Increases in coho and steelhead production reflect the additional releases of underyearling fry and fingerlings into inaccessible or underutilized habitat.

Chinook production is less than expected, due primarily to poor adult escapement to the Capilano and Puntledge hatcheries in 1981. Another contributing factor is that chinook production at Big Qualicum was reduced to avoid smolt quality problems associated with higher densities.

Survival to release at almost all hatcheries exceeded expectations.

These releases are expected to produce 5,070,000 adult fish for the commercial, native food and sport fisheries and for escapement. The geographic and species distribution of this adult production is shown in Table 4, and the detailed production information for every project is shown in Table 5 at the back of this report.

The Salmonid Enhancement Program operates 28 facilities. Of these, thirteen are major hatcheries, five are spawning channels and the balance are small and pilot hatcheries.

The Tenderfoot and Chehalis hatcheries were in operation for the first time in 1982. Tenderfoot will produce chinook and coho; Chehalis is for chinook, coho, steelhead and cutthroat.

The $2.5 million hatchery at Quesnel released smolts of four upper Fraser chinook stocks in 1982. The newly-expanded facility at Inch Creek was completed in time for the chum and coho egg-takes and operations were expanded to include Stave River chum.

Pilot projects

McGregor River chinook were produced at the Penny pilot on the upper Fraser in 1982. A small hatchery on the Stuart River incubated chinook eggs to test the feasibility of fish culture using a water supply with a high iron content.

On the Skeena River, the Kitsumkalum pilot hatchery is being used to determine the economic feasibility of heating cold water for incubation and rearing of chinook. The experimental design and equipment were improved in 1982, after the 1981 results proved inconclusive.

The highly successful chinook pilot hatchery on the Kitimat River will continue until the major facility is completed in 1983.

Table 4: Distribution of Adult Production from SEP Major Federal Facilities*

Species	North	South	Fraser	Total
Coho	5,000	752,000	119,000	876,000
Chinook	7,000	451,000	49,000	507,000
Chum	228,000	1,078,000	141,000	1,447,000
Pink	—	178,000	40,000	218,000
Sockeye	2,000,000	—	—	2,000,000
Steelhead	1,000	15,000	3,000	19,000
Cutthroat	—	—	3,000	3,000
TOTAL:	2,241,000	2,474,000	355,000	5,070,000

* Total adult production, in pieces, from 1982 juvenile releases. This production will be in the fisheries and returning to spawn in the years 1983 to 1986, depending on the species and age of the fish.

Engineering

The budget for design and construction declined by approximately $4 million, to $9 million for 1982/83, as most of the Phase I facilities neared completion.

This reduction also meant that the Glendale spawning channel for pink salmon and the accompanying chinook and coho hatchery will be postponed indefinitely, with the subsequent loss of 10 percent of SEP's planned production capacity in Phase I.

The poor economic climate has resulted in very competitive bidding on facility construction.

By year-end, a status report of facility construction showed that:

- the mild winter allowed construction of the Kitimat hatchery to proceed smoothly. Substantial progress has been made on the intake, rearing ponds, water supplies, buildings and aeration tower. This project, which will be completed within its $9.6 million capital budget, will be operational in September 1983. The facility is seen as part of the total management/enhancement solution in the rehabilitation of local stocks.

  One of the many innovations in the hatchery design is the use of waste heat (from the Eurocan pulp mill) to heat the hatchery water supply. The operation of the hatchery is expected to lead to important advances in the culture of fish in northern climates
- the Tenderfoot hatchery was expanded with the addition of concrete rearing ponds, expanded water supply and a three-phase electrical distribution system. The original $500,000 facility, as well as the $300,000 expansion, was built entirely by small local contractors. The increased rearing capacity will be fully utilized in the first year of operation, thus hastening the rehabilitation of chinook, coho and steelhead in the Squamish system
- construction work was suspended on the Glendale spawning channel and hatchery due to a shortfall of operating funds in other areas of the Program. The site was cleaned up, ditched and a river obstruction removed. Design work

will continue so that this promising project will be ready for immediate construction as soon as funding permits

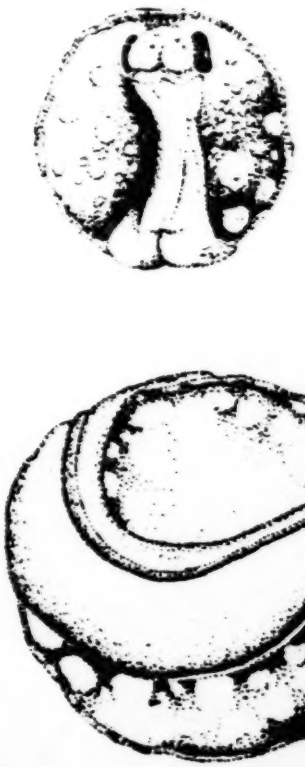
- the $6.7 million Chehalis hatchery was operational in fall 1982. Union and nonunion contractors were used, and the work was completed well on time and under budget. Through the combination of good competitive bidding and a tight control of conceptual and detailed design by SEP's own engineering division, $750,000 was saved
- existing facilities at Inch Creek were kept operational while new incubation capacity and then new rearing capacity were built. The sequenced construction enabled staff to increase the size of the egg-take during the year of expansion. The new addition provides increased rearing for coho and full facilities for Stave River chum stock. Adding the Stave component to the $1.9 million Inch facility instead of building a facility at Stave River saved over $1 million in capital costs and will mean substantially lower operating costs
- the Eagle River pilot hatchery for Thompson River chinook is now in place. The $450,000 pilot hatchery was completely designed and constructed in 1982. A caretaker is monitoring the well and behavior of the water systems during the last months of the winter. Egg-takes will be initiated in fall 1983
- special job creation funds allowed for development and detailed design work for chinook pilot hatcheries at Fort St. James, Spius Creek (Nicola), Shuswap Falls and Clearwater. These pilots were modelled on the Eagle River pilot hatchery concept and will provide the framework for chinook and coho enhancement in the Thompson and Stuart River systems
- the finishing touches were added to the Nitinat River facility. A manager's residence and carport were constructed to complete the services necessary for full operation of the hatchery. Major mechanical renovations were necessary because of a fire in the generator building — two backup systems were disabled in this fire — but the activation of the third backup system prevented the loss of some ten million fry. The hatchery is now completely finished and operating satisfactorily
- major repairs, capital improvements and renovations were carried out at many SEP facilities.

Future projects

Some reconnaissance and feasibility work planned for 1982/83 was cancelled when extra funding requested for SEP was not forthcoming. Detailed juvenile salmonid surveys on the North and South Thompson Rivers were carried out.

The biological and engineering reconnaissance being carried out in the latter part of Phase I is concentrating mainly on identifying enhancement opportunities for Phase II. Most of this work was on Vancouver Island and the coastal mainland.

Salmon egg about to hatch



Provincial perspective

SEP is a federal/provincial program. Steelhead and sea-run cutthroat enhancement projects comprise the provincial components of the program. Enhancement of these species can be divided roughly into three programs:

- fry program: the fry program releases young (2-4 months old) hatchery fry into underutilized or unused areas of streams. The idea is to use this habitat to increase the production from streams. Testing of different stocking methods is now complete and a number of fry projects are operating at production levels. Maximum returns are expected over the next 2-5 years
- smolt program: adult returns from hatchery production of yearling fish are starting to appear. With the exception of poor results on the Fraser River system, results have been satisfactory. Programs at Robertson Creek, at Cowichan and Qualicum have shown excellent survival rates. Other sites have been operating about as well as expected
- steelhead management: the catch and release regulation adopted for the sport fishery has resulted in increasingly strong adult returns on most Vancouver Island streams. The angling community has accepted this regulation as a necessary management strategy in the medium term.

Other highlights include:

- a portable hatchery was in operation at Duncan in 1982
- the Keogh River was fertilized for the first time in 1982, and the first evaluations of stream enrichment indicate that this is a promising enhancement technique
- the first adults from the Keogh River steelhead net pens returned in 1982.

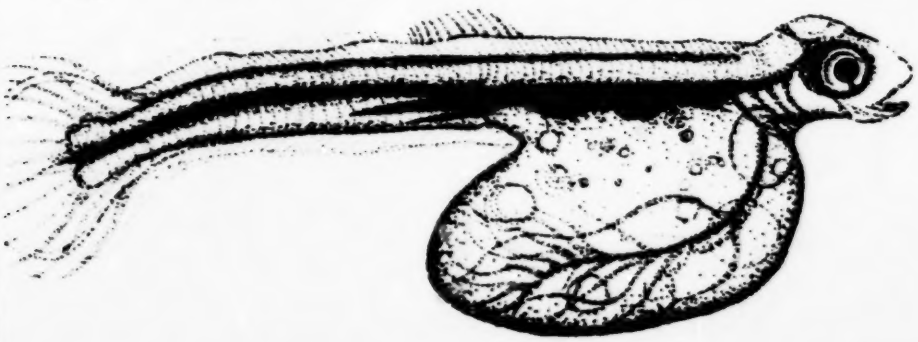
Education, advice, participation

The Salmonid Enhancement Program pioneered the concept of public involvement in government programs and today is recognized as a world leader in this field. Volunteers are the unique ingredient in this government program. In 1982, close to 6,500 volunteers were involved in salmonid enhancement.

Working for SEP

SEP's community advisors are the key to the success of public involvement. Stationed throughout the province, they act as special consultants to community groups and individuals wishing to start volunteer enhancement projects. In 1982, three new community advisors were hired, bringing the total number to nine. Between them, they supervised 110 volunteer projects.

Rounding out the volunteer aspect of SEP is the Salmonid Enhancement Task Group. This 19-member group provides advice on what are the public's wishes regarding the Program. The Task Group, representing such diverse interests as commercial, sport and Indian food fishing, mining, hydro and consumers, is very supportive of the Program. In 1982, the Group's efforts were directed to seeking increased funding for the Program. The extra $1.5 million received in 1982/83 can be credited, in part, to the strong representations made by the Group on SEP's behalf.



Alevins

Public information

SEP's education and information programs are important elements of the Program. The Educator's Package, *Salmonids in the Classroom*, continues to be heavily used in B.C. schools. A version of the package is being developed for the primary grades.

A model of a hatchery proved very popular at the "Salute to the Sockeye," at Adams River. It was seen by about 250,000 people. Salmon and trout hatcheries continue to draw hundreds of thousands of visitors each year.

SEP reaches the public through the *Salmonid* newsletter, its annual reports, published in French and English, slide shows, displays, brochures and other publications.

For the third year, a fishery for children was held in Vancouver's False Creek. Special activities, displays and fishing boat tours added to the fun for both children and adults. About 9,000 children and adults attended the three-day event.

Innovative techniques

SEP's Small Projects Unit is a team of biological and engineering experts. In addition to developing and operating their own projects, they provide advice to SEP's volunteer and community development projects. Because of the special circumstances of most of these projects (e.g. — often inexperienced volunteer labor, small size of the project, paid project staff undergoing on-the-job training), this group has been the source of many simple but innovative enhancement techniques. Low-cost hatchery buildings, side channel enhancement, a floating counting fence design, and barren lake transplants are four examples of developments from the Small Projects Unit. They have also developed new incubation box designs, and in conjunction with the provincial Fish and Wildlife Branch, refined stream assessment techniques.

Community development

Projects funded under SEP's Community Economic Development Program (CEDP) continued apace. These projects are long-term enhancement projects in areas of high unemployment. Several Indian bands have contracts with SEP for this enhancement work, thus providing meaningful employment for many band members. Some of these projects have been in operation since the beginning of SEP in 1977.

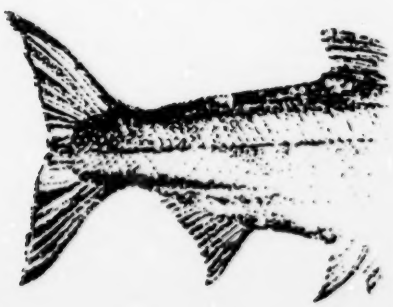
Releases, returns

Fourteen community economic development projects were in operation in 1982. Together, they released a total of 9.62 million salmonid fry and smolts in the spring, up from 8.44 million in 1981. (Table 5.)

These projects reached 76 percent of their egg-take targets, and by year-end 16 million eggs were incubating. The shortfall was attributed to the limited number of chinook for brood stock on Vancouver Island and to the fact that the Kispiox hatchery was not in operation in 1982. It was closed for one year to build a new log hatchery building.

CEDP facilities contributed to the commercial and sport catch in 1982. Sliammon, Nanaimo, Sechelt, Cowichan, Alouette, San Juan and Seymour projects produced fish for the commercial and sport fisheries. Based on coded-wire tag returns, an estimated 11.4 percent of the 1979 brood Sliammon coho were caught in the fisheries. The 1980 brood Nanaimo chinook produced an estimated 6,800 three-year-old fish for the fishery, or about 3.4 percent of the total release. Sechelt's 1979 brood coho (7.2 percent contribution), Cowichan's 1979 brood four-year-old chinook (1.66 percent contribution), and Seymour's 1979 coho (1.95 percent contribution) were the other main CEDP producers for the 1982 sport and commercial fisheries.

Fry



Long-term employment

These groups have worked on their projects for two to five years:

- Bella Bella Band, a hatchery
- Bella Bella Deer Band, a hatchery
- Chehalis Band, a hatchery and spawning channel
- Cowichan Band, a hatchery
- B.C. Institute of Technology, a hatchery and sea pens
- Kincolith Band, a hatchery
- Kispiox Band, a hatchery
- Masset Band, sea pens and incubation box
- Nanaimo Community Employment Advisory Society, a hatchery
- Nimpkish Band, a hatchery
- San Juan Enhancement Society, a hatchery
- Sechelt Band, a hatchery and sea pens
- Sliammon Band, a hatchery
- Thornton Creek Enhancement Society, a hatchery.

On-the-job training is an important aspect of these jobs. Over the years, the workers on these projects have increased their skills in project management and fish culture. As their skills improve, they rely less and less on the expertise of SEP's technical advisors and project coordinators. The goal is to have these projects operate as independent contracts, although still funded by SEP.

Approximately 85 people were employed on these projects in 1982.

New projects

With the help of the Canada Employment and Immigration Commission (CEIC), five new projects got underway in 1982. CEIC paid for the wages and training of project managers in the first year of the new projects, and SEP will pay for these costs in the second and succeeding years. The Indian communities of Hartley Bay, Skidegate, Klemtu, Kitsumkalum and Fort Babine are benefiting from this funding. Basic streams reconnaissance was the focus of activities in the first year while people were being trained.

The Canada Community Development Program (CCDP) was another source of funds. SEP and CCDP jointly funded two projects in the Fraser River system. The Central Interior Tribal Council hired a biologist who began a survey of enhancement opportunities in the Council's area. The North Thompson Indian Band received funding for coho enhancement in the Barriere region. The intention is that these projects will receive long-term funding if enhancement opportunities are found.

The Special Employment Initiatives Program funded three enhancement projects, at Powell River, Port Hardy and Terrace. The Powell River Enhancement Society and the Terrace-Kitsumkalum Salmonid Enhancement Society each employed four people to carry out stream improvement work and to look for hatchery sites. The Northern Vancouver Island Salmonid Enhancement Association in Port Hardy employed two people in the location of two hatchery sites plus several local contractors for initial construction. The hatcheries, for coho, chum, sockeye and pink salmon, will be located on Stephens Creek and Quatse River. SEP employed an additional four people as project advisors to these projects.

Adults return upstream to spawn

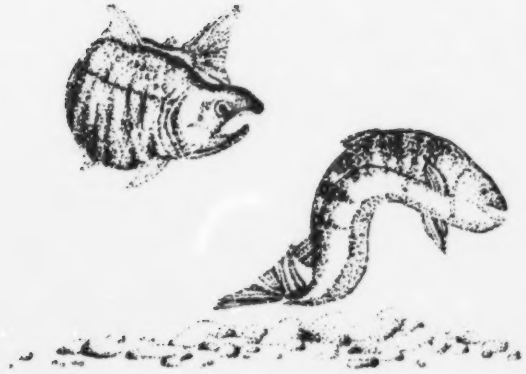
Job creation

In 1982, as the recession deepened and unemployment increased, the federal government initiated job creation programs. SEP was a beneficiary, receiving $1.5 million under job creation and special employment initiatives programs and $3 million from the Canada Employment and Immigration Commission (CEIC).

The time frame for the job creation projects was short, and SEP wasted no time in getting these projects underway as soon as possible. Between June 1982 and March 31, 1983, 800 people were employed by SEP for periods ranging from four to 36 weeks. In total, this represented 243 person-years of employment. (A person-year of work is defined as one year of work for one person.) The program was a part of the National Employment Bridging Assistance Program, designed to provide job opportunities for those receiving Unemployment Insurance.

Valuable work

The projects, scattered throughout the province, fell into four broad categories: information collecting, direct fish production, habitat improvement and facility expansion. Many information gathering activities were appropriate for this program and included spawner enumerations, obstruction assessment, fish quality studies, bioreconnaissance (including identification of habitat features), site assessment for fry planting and subsequent mapping, and life history studies.



Pair of spawning salmon

The construction and operation of small enhancement projects, brood stock collections, rearing programs, eyed-egg plants and fry planting all provided direct benefits in fish production.

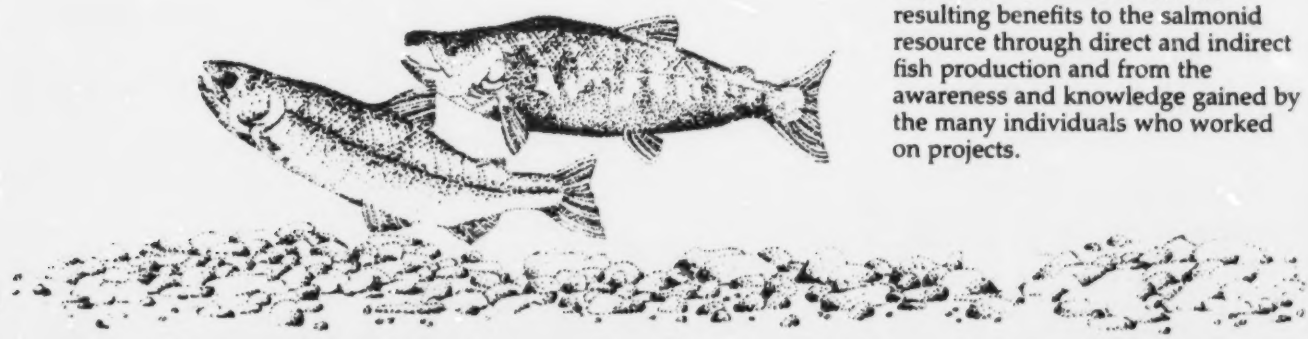
Habitat improvement activities included boulder placement, gravel placement, replanting, erosion control and stream bank stabilization, construction of flow control weirs, fishway construction (best exemplified by the Millstone Creek fishway at Nanaimo) and removal of obstructing debris. Nearly all of SEP's major facilities and many of the community development projects utilized a job creation crew to carry out tasks which would otherwise have remained undone.

Various contractors

Many different sectors of the public were involved as contractors with a complete range of fisheries and contracting experience. Some of the larger contracts were with regional district councils and involved 50 participants or more. The average contract involved eight individuals and cost approximately $25,000. Contractors also included community salmonid enhancement societies, fish and game clubs, tribal councils and more than 25 native bands, commercial fishermen's organizations and many independent individuals.

Exceed target

The SEP Job Creation Program surpassed, by approximately fifteen percent, its official mandate to create jobs. Just as important, it can be considered a success from the resulting benefits to the salmonid resource through direct and indirect fish production and from the awareness and knowledge gained by the many individuals who worked on projects.



Research

Research funded by SEP and undertaken jointly with the Fisheries Research Branch is aimed at improving enhancement techniques, developing new ones and examining the impacts of enhancement on wild salmonid populations.

Lake enrichment

Lake enrichment has been around for so long that some regard it as an established enhancement technique. While years of experimentation have yielded good data on how the process works, research scientists feel that lake enrichment is still about five to ten years away from becoming an established enhancement technique.

Twelve lakes, five of them on Vancouver Island, were fertilized in 1982.

The adult returns to lakes fertilized four and five years ago ranged from well above to slightly below expectations.

The adult return to Hobiton Lake was 75,000 sockeye, exceeding all previous runs. Historically the average stock for this lake has been listed at 5,000-10,000. The large return in 1982 indicated an excellent marine survival rate of 20-25 percent by some of the largest smolts (4.6g) ever produced at Hobiton.

Long Lake also received a good run of 500,000 fish, and Kennedy Lake returns numbered 120,000-150,000 — more than had been seen there for decades.

The returns to Henderson Lake were less than expected (60,000 instead of 107,000), as were returns to Great Central Lake (346,000 instead of 423,000).

Scientists cannot yet explain the great range of returns to fertilized lakes.

Nevertheless, commercial fishermen continue to benefit from these stock enhancement experiments. In 1982, they caught an estimated 600,000 sockeye produced from lake enrichment.

Other studies

Cataract disease, caused by a diet deficiency, was spotted in some hatchery chinook smolts released in 1981. Jack chinook returns in 1982 to several affected hatcheries were average to good, indicating that the impact of the disease may have been overestimated.

Controlling the sex of salmonids may sound exotic, but there are some very practical benefits to this research. If the number of female salmon can be increased (i.e. — changing male salmon to female salmon), hatcheries can increase their egg-takes and thereby increase their production faster. Producing more females also reduces the number of jack salmon, sexually mature males which return to spawn one year early. These males are unwanted because they are too small to be caught in the commercial net fishery, and they are not generally used in hatchery egg-takes.

The wide-ranging study on the Keogh River of steelhead enhancement techniques included stream enrichment for the first time, as well as net-pen rearing. Preliminary evaluations of stream enrichment indicate that this, too, is a promising technique. The first adults from the net pens returned in 1982, allowing for a good assessment of this technique.

Nose tagging

The Mark Recovery Program began in 1973, and SEP has been a major funder of this program in recent years. Microscopic "nose tags" are injected into the nose of some juvenile hatchery and wild fish before they migrate to the ocean. When they are recovered from adult fish, the tags yield valuable information on the timing, migration and exploitation of both Canadian and American stocks. Information from tagged fish is also vital in the evaluation of SEP facilities and for enhancement planning.

This is the first year that a direct effort has been made in sampling chum salmon coast-wide for coded-wire tags. Sample numbers for coho increased dramatically over 1981, reflecting the increased coho catch.

The life cycle is completed with egg fertilization

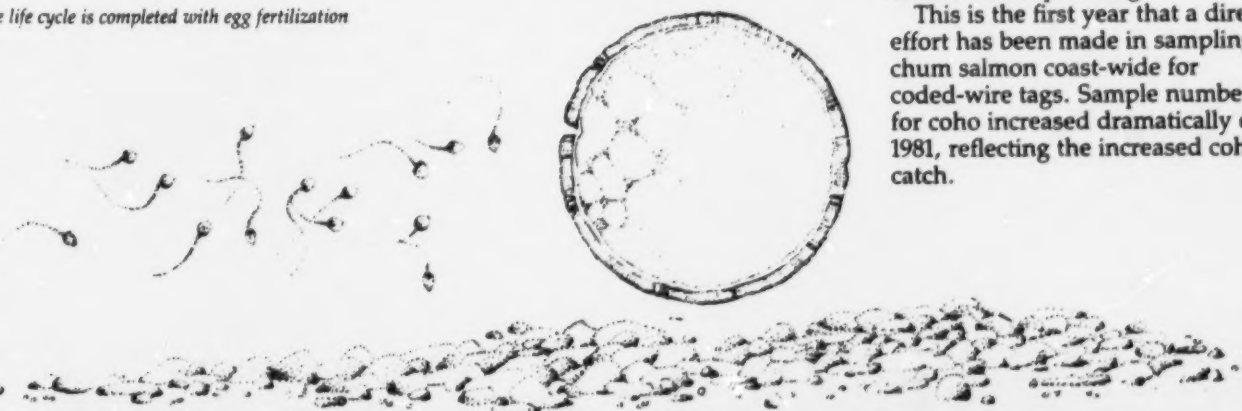


Table 1: SEP Expenditures by Program Area (in Thousands of Dollars)

	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Program Area						
Major Production Projects	$1,621	$ 6,754	$11,974	$12,847	$12,897	$ 9,715
Minor Production Projects	252	726	1,098	1,461	1,212	1,211
Pilot Production Projects	283	284	135	244	181	383
Facility Operations and Maintenance	1,344	2,803	3,820	5,777	8,150	9,345
Community Development Projects	453	1,929	2,813	3,168	2,959	3,672
Lake Enrichment	307	676	1,095	1,345	1,454	1,801
Public Involvement	505	829	830	874	1,051	1,278
Reconnaissance/Feasibility Studies	1,581	754	1,508	1,588	990	394
Manageability and Environmental Studies	764	1,725	1,267	1,488	730	587
Evaluation/Assessment Studies	354	608	157	402	332	294
Research Studies	459	461	644	691	396	718
Program Planning and Direction	791	1,032	1,196	1,633	775	1,361
Provincial Program (Federal Share)	364	865	688	744	376	460
Provincial Program (Provincial Share)	264	289	1,243	1,250	1,250	1,250
TOTAL	$9,342	$19,735	$28,468	$33,512	$32,753	$32,449
Source of Funds						
SEP Phase I	$7,878	$17,146	$24,735	$28,462	$26,911	$26,000
DFO* Contribution	1,200	2,300	2,500	3,800	4,592	5,199
Provincial Share	264	289	1,243	1,250	1,250	1,250
TOTAL	$9,342	$19,735	$28,478	$33,512	$32,753	$32,449
Phase II Program Development	—	—	—	—	$ 2,466	$ 1,496

* Department of Fisheries and Oceans.

Table 2: Forecast Catch from Existing SEP Projects* at Design Capacity**

	Canadian Catch	
Species	**Pieces**	**Pounds**
Sockeye	4,171,943	23,789,653
Chum	1,211,718	14,098,990
Pink	346,465	1,543,174
Coho	573,939	2,854,931
Chinook	582,841	5,083,392
Steelhead	36,122	371,639
Cutthroat	18,919	193,257
TOTAL	6,941,947	47,935,036

*Projects constructed before SEP as well as SEP projects which are completed as of March 31, 1983.

**Projected Canadian commercial, sport and native food fish catches, each year.

Table 3: Summary of 1982 SEP Fish Production*

Species	Juveniles Released	Expected Adult Production
Sockeye	285,990,583	3,863,374
Chum	124,533,794	1,890,336
Pink	10,029,162	250,727
Coho	11,063,688	700,593
Chinook	17,572,749	514,657
Steelhead	1,305,902	30,577
Cutthroat	173,519	13,838
TOTAL	450,669,397	7,264,102

*Includes production from all SEP facilities and projects, and lake enrichment.

How to read Table 5:

Example: Bella Coola hatchery released 2,132,976 chum fry in 1982. These fry are expected to result in a total adult production of 42,659, of which 29,861 are expected to be caught in commercial, native food and sport fisheries. These fish will be caught or will return to the hatchery in the years 1984-86. When the hatchery is at design ("full") capacity, it is expected to produce 130,000 adults per year, of which 90,090 per year will be caught in the various fisheries.

Table 5: Juvenile Fish Production from SEP Facilities* in 1982 and Adult Production at Design Capacity

Project	Type	Species	Juveniles Released	Expected[12] Adult Production	Contribution to Fisheries	Years of Return to Fishery	AT DESIGN CAPACITY Adult Production	AT DESIGN CAPACITY Catch[11]
Facilities								
Snootli (Bella Coola)	Japanese hatchery	chum	2,132,976	42,659	29,861	1984 - 1986	130,000	90,090
		coho	56,600	849	630	1984 - 1985	4,000	2,820
		chinook	94,696	710	318	1984 - 1987	10,000	4,485
		steelhead[1]	49,100	314	157	1984 - 1988	600	300
Big Qualicum R.	sp. channel	chum	45,441,471	389,398	171,335	1984 - 1986	349,000	153,560
	hatchery	coho	1,689,496	185,163	103,320	1983 - 1984	202,000	112,591
	hatchery	chinook	3,466,608	103,997	72,880	1983 - 1986	90,000	63,335
	hatchery	steelhead[1]	72,187	2,888	1,444	1984 - 1985	6,600	3,280
Birkenhead R.	hatchery	chinook	45,720	1,199	982	1983 - 1986	2,900	2,387
Capilano R.	hatchery	coho	1,438,699	94,164	41,356	1983 - 1984	75,000	27,075
		chinook	1,026,748	31,141	21,705	1983 - 1986	60,000	43,895
		steelhead	16,747	168	104	1984 - 1985	800	400
Chehalis R.	hatchery[2]	chum					201,600	87,615
		coho					64,000	37,440
		chinook					30,000	24,564
		steelhead					4,800	2,880
		cutthroat					5,000	3,350
Chemainus R.	hatchery	coho	26,296	394	230	1983 - 1984	700	390
		chinook	13,723	412	337	1983 - 1986	4,500	3,167
Chilliwack R.	hatchery	chum	3,884,950	77,699	33,767	1984 - 1986	100,000	43,460
		coho	145,574	21,836	12,774	1983 - 1985	150,000	87,750
		chinook	461,698	13,851	11,341	1983 - 1986	32,400	26,529
		steelhead	66,389	2,655	1,593	1984 - 1985	6,000	3,600
Eagle R.	hatchery[2]	coho					10,800	6,318
		chinook					8,100	6,632
Fulton R.	sp. channel	sockeye	138,300,000	1,369,170	572,313	1984 - 1986	1,125,000	470,250
Inch Cr.	incubation box	chum	3,097,492	61,950	26,923	1984 - 1986	70,400	30,596
	hatchery	coho	96,386	1,445	845	1983 - 1985	4,100	2,398
	hatchery	cutthroat	24,214	1,936	1,297	1984 - 1985	3,000	2,010
Jones Cr.	sp. channel	chum	251,400	2,514	1,092	1984 - 1986	1,200	522
		pink	1,572,400	39,310	18,908	1983	34,000	16,355
Kitimat R.	pilot hatchery[13]	chum	30,345	607	424	1984 - 1986		
		coho	54,000	810	486	1984 - 1985		
		chinook	159,470	4,785	2,799	1983 - 1987		
		steelhead	25,600	256	128	1984 - 1988		
Kitimat R.	hatchery[2]	chum					158,400	118,800
		pink					10,000	6,000
		coho					60,000	36,000
		chinook					64,500	37,732
		steelhead					1,000	500
Kitsumkalum	pilot hatchery[14]	chinook	157,450	1,181	432	1983 - 1987		
Little Qualicum R.	sp. channel	chum	4,194,686	66,531	29,273	1984 - 1986	367,000	161,480
	hatchery	chinook	1,411,157	42,335	29,668	1983 - 1986	40,000	28,149
	hatchery	steelhead	23,555	942	471	1984 - 1985	1,200	600
Mathers Cr.	pilot hatchery	chum	518,552	10,371	4,517	1984 - 1986	15,800	6,882
Nitinat R.	Japanese hatchery	chum	27,178,532	543,572	239,171	1984 - 1986	403,200	177,408
	hatchery	chinook	491,624	14,749	7,905	1983 - 1986	32,400	17,366
North Thompson	hatchery[2]	coho					4,600	2,691
		chinook					7,200	7,516
Pallant Cr.	Japanese hatchery	chum	7,207,389	180,185	78,488	1984 - 1986	144,000	62,726
		coho	192,857	2,893	1,296	1983 - 1985	3,200	1,434
		steelhead[15]	5,128	51	28	1984 - 1988		
Penny	pilot hatchery	chinook	151,493	1,136	930	1983 - 1986	2,900	2,358
Pinkut Cr.	sp. channel	sockeye	99,700,000	987,030	412,578	1983 - 1986	540,000	225,720
Puntledge	hatchery	chum	2,323,392	46,468	20,445	1984 - 1986	120,000	52,800
		pink	947,188	23,679	14,207	1983	10,000	6,000
		coho	3,762,908	191,607	106,916	1983 - 1984	128,000	71,344
		chinook	308,889	8,315	5,827	1983 - 1986	151,000	106,262
		steelhead	85,863	2,483	1,241	1984 - 1985	4,000	2,000
Quesnel R.	hatchery	chinook	62,612	1,409	1,153	1983 - 1986	52,600	43,068
Quinsam R.	hatchery	pink	5,362,560	134,064	80,438	1983	156,000	93,600
		coho	263,000	7,890	4,402	1983 - 1984	162,000	90,296
		chinook	765,464	22,963	16,092	1983 - 1986	30,000	21,112
		steelhead	110,262	1,470	764	1984 - 1985	1,000	500
		cutthroat					200	134

Table 5: Juvenile Fish Production from SEP Facilities[9] in 1982 and Adult Production at Design Capacity

Project	Type	Species	Juveniles Released	Expected[12] Adult Production	Contribution to Fisheries	Years of Return to Fishery	AT DESIGN CAPACITY	
							Adult Production	Catch[11]
Robertson Cr	hatchery	coho	991,262	148,690	63,936	1983 - 1984	150,000	64,350
		chinook	7,858,989	235,768	126,371	1983 - 1986	225,000	120,600
		steelhead[1]	221,809	8,872	7,985	1983 - 1985	6,700	6,030
Tenderfoot/ Cheakamus	hatchery[2]	coho					7,500	4,582
		chinook	96,917	2,181	1,520	1983 - 1986	5,000	3,658
		steelhead					1,000	500
Tlupana Inlet	Japanese hatchery	chum	12,605,990	252,120	110,932	1984 - 1986	331,200	145,728
	hatchery	coho	99,382	2,211	1,050	1983 - 1984	1,300	617
	hatchery	chinook	152,000	4,560	2,079	1983 - 1986	43,200	19,699
Tsolum R.	satellite hatchery	pink	714,454	17,860	10,716	1983	80,000	48,000
Community Development Projects								
Bella Bella	hatchery[2]	sockeye					400	156
		chum	525,504	8,408	5,826	1984 - 1986	33,700	23,333
		coho					1,800	1,269
Bella Bella Deer	hatchery[2]	sockeye					792	314
		chum					15,650	10,845
		pink					2,000	1,200
		coho					4,050	2,855
Chehalis Band Project	sp. channel	chum	2,277,121	18,217	7,917	1984 - 1986	102,900	44,720
	hatchery[2]	coho					7,000	4,081
		chinook	79,260	1,909	1,563	1983 - 1986	2,200	1,768
Cowichan R.	hatchery	chum	690,000	11,040	4,857	1984 - 1986	28,800	12,672
		coho	4,300	645	359	1983 - 1984	25,300	14,102
		chinook	32,326	776	543	1983 - 1986	10,800	7,600
False Creek[13]	sea pens	chinook	12,447	5,318	4,352	1983 - 1986	1,500	1,228
Kincolith R.[10]	hatchery	chum[2]					23,900	12,740
		pink[2]					52,400	36,756
		coho					6,100	2,871
		chinook					6,500	2,216
Kispiox R.	hatchery[2]	coho	24,535	294	191	1984 - 1985	15,100	6,369
		chinook	33,390	1,002	611	1984 - 1987	10,800	1,449
		steelhead					1,000	525
Masset R.	sea pens	chinook	57,000	1,710	1,368	1984 - 1987	6,500	3,110
	incubation box	sockeye	6,629	111	63	1984 - 1987	800	442
		coho	5,005	679	265	1984 - 1985	9,000	3,528
		chum					640	274
Nanaimo R.	hatchery	chum	888,000	14,208	6,251	1984 - 1986	14,400	6,336
		coho	113,084	1,356	756	1983 - 1984	13,500	7,550
		chinook	14,350	430	301	1983 - 1986	10,800	7,600
		steelhead	37,400	239	119	1984 - 1985	2,800	1,425
		cutthroat	2,188	219	131	1984 - 1985	1,400	938
		pink[18]	2,560	64	38	1983		
Nimpkish	hatchery[2]	sockeye	1,393,100	23,335	13,067	1985 - 1986	205,300	114,940
		chum	235,940	1,889	868	1984 - 1985	10,800	4,968
		chinook					5,405	3,672
		coho					6,750	4,725
San Juan R.	incubation box[2]	sockeye	92,854	1,560	951	1984 - 1986	200	122
		chum	7,100	57	25	1984 - 1986	300	141
		coho	507,415	6,089	2,131	1983 - 1984	43,200	15,120
		chinook	186,932	4,486	2,476	1983 - 1986	10,000	5,544
		steelhead					1,400	1,215
Sechelt	hatchery[2]	chum					4,100	1,782
		coho	18,290	3,788	2,310	1983 - 1984	9,100	3,289
	sea pens	chinook	9,734	2,920	2,482	1983 - 1986	12,500	9,145
Seymour R.	hatchery[2]	chum					720	313
		pink					1,000	481
		coho	87,000	7,944	4,646	1983 - 1985	4,700	2,725
		steelhead	20,840	678	406	1984 - 1985	1,300	756
		cutthroat	1,700	357	239	1984 - 1985	500	300
Sliammon R.	Japanese hatchery	chum	990,000	15,840	6,970	1984 - 1985	37,500	16,500
	hatchery	coho	4,800	540	329	1983 - 1984	16,200	5,846
Thornton Cr.	hatchery[2]	chum	1,276,870	25,537	11,236	1984 - 1986	50,000	22,000
		coho					9,000	3,861
		chinook					7,600	4,052

Table 5: Juvenile Fish Production from SEP Facilities* in 1982 and Adult Production at Design Capacity

Project	Type	Species	Juveniles Released	Expected[12] Adult Production	Contribution to Fisheries	Years of Return to Fishery	AT DESIGN CAPACITY: Adult Production	AT DESIGN CAPACITY: Catch[11]
Small Projects								
Alouette R.	hatchery[2]	chum	63,825	1,277	554	1984 - 1986	21,600	9,387
		coho					1,100	632
		chinook					1,100	884
Chilqua Slough	side channel	chum	895,862	12,540	5,449	1984 - 1986	7,900	3,450
Copper R. (Zymoetz)	box	chinook	135,157	2,522	923	1984 - 1986	700	4
		coho					2,100	758
Hemming R.	——[2]	chum	175,720	2,460	1,069	1984 - 1986		
Hopedale Slough	side channel[16]	chum	1,753,433	24,550	10,802	1984 - 1985	11,800	5,192
Judd Slough	side channel	chum	968,963	13,570	5,970	1984 - 1985	4,600	2,204
Lower Paradise	side channel	chum					7,315	3,219
McNab Cr.	side channel[2]	chum					2,200	794
		coho					100	50
		steelhead					16,000	6,954
Peach Cr. Rehab	side channel[2]	chum	198,708	2,780	1,208	1984 - 1986	100	87
		coho					4,900	2,130
Railroad Cr.	side channel	chum	298,004	4,170	1,812	1984 - 1986	7,500	3,360
Sachs Cr.	box[2,3]	coho	57,685	865	388	1983 - 1985		
Street Cr.	side channel[16]	chum	242,220	3,390	1,473	1984 - 1986	18,900	8,316
Upper Paradise	side channel[2]	chum	1,523,233	21,330	9,385	1984 - 1985	200	65
		coho					16,000	7,040
Vancouver R.	hatchery	chum	150,000	1,200	528	1984 - 1985	15,000	11,100
		pink	1,350,000	33,750	16,234	1983		
Westholme Side Channel	side channel	chum	1,872,717	26,220	11,536	1984 - 1986	13,600	5,984
Worth Cr.	side channel	chum	352,151	4,900	2,129	1984 - 1986	5,000	2,173
Lake Enrichment[4]								
Bonilla L.[5]	fertilization	sockeye	115,000	5,173	2,028	1984 - 1986	43,500	17,052
Curtis L.	fertilization	sockeye	257,000	11,565	4,533	1984 - 1986	130,000	50,960
Devon L.	fertilization	sockeye	59,000	1,475	578	1984 - 1986	85,000	32,320
Great Central L.	fertilization	sockeye	11,924,000	536,580	300,485	1984 - 1986	1,797,000	1,096,170
Henderson L.	fertilization	sockeye	1,359,000	61,155	37,305	1984 - 1986	572,300	349,103
Hobiton L.	fertilization	sockeye	540,000	24,300	14,823	1984 - 1986	172,900	105,469
Kennedy L.	fertilization	sockeye	790,000	35,550	21,686	1984 - 1986	600,000	366,000
Kitlope L.[5]	fertilization	sockeye					653,400	256,133
Long L.	fertilization	sockeye	1,840,000	46,000	25,760	1985 - 1986	884,100	486,255
Lowe L.	fertilization	sockeye	246,000	11,070	4,339	1984 - 1986	307,600	120,579
Woss L.	fertilization	sockeye	2,539,000	63,475	35,546	1985 - 1986	600,000	336,000
Nimpkish L.	fertilization	sockeye	12,758,000	318,950	178,612	1985 - 1986		
Awun L.	fertilization	sockeye	167,000	7,515	4,208	1984 - 1987		
Eden L.	fertilization	sockeye	297,000	13,365	7,484	1984 - 1987	255,500	143,080
Ian L.	fertilization	sockeye	272,000	12,240	6,854	1984 - 1987		
Sproat L.	fertilization[16]	sockeye	13,335,000	333,375	203,359	1984 - 1986		
Research Production								
Rosewall Cr.	hatchery[6]	steelhead	26,230	262				
Rosewall Cr. Oyster R.		steelhead	16,787	168				
Provincial SEP-Funded								
Abbotsford	hatchery	steelhead	436,766	7,639	3,820	1984 - 1985	5,650	3,390
		cutthroat	55,196	5,520	3,698	1984 - 1985	5,500	3,685
Duncan	hatchery	steelhead	3,274	131	65	1983 - 1985	1,390	1,251
		cutthroat	39,264	3,926	2,630	1983 - 1985	3,500	4,050
Loon Cr.	hatchery	steelhead	76,586	1,200	600	1984 - 1985	1,200	720
		chinook	90,800	681	606	1983 - 1986	1,500	1,125
Surrey	rearing pond	cutthroat	45,757	1,698	56.60	1984 - 1985	2,000	1,340
		steelhead	11,379	161	82	1984 - 1985	400	240

Table 5: Juvenile Fish Production from SEP Facilities* in 1982 and Adult Production at Design Capacity

Project	Type	Species	Juveniles Released	Expected** Adult Production	Contribution to Fisheries	Years of Return to Fishery	AT DESIGN CAPACITY	
							Adult Production	Catch**
Public Involvement Projects*								
Anderson Cr.	incubation box	chum	98	1				
Beach Cr.	incubation box	coho	19,000	228				
Beaver Cr.	incubation box	coho	2,000	30				
Brunette Cr.	incubation box	coho	8,000	96				
Bulkley R.	incubation box	chinook	352	21				
Cheakamus R.	incubation box	coho	450	4				
Chilliwack R. (Chilliwack Senior Sec. School)	incubation box	chum	1,200	24				
Chilliwack R. (Centre Creek Correction Camp)	incubation box	chum	38,000	760				
Cook Cr. Blue R.	incubation box	coho	28,000	34				
Coonskin Cr.	incubation box	coho	1,330	16				
Deep Cr.	incubation box	coho	3,000	36				
Demamiel Cr.	incubation box	coho	28,600	429				
Diana Cr.	incubation box	coho	18,750	225				
Drew Harbour Cr.	incubation box	chum	25,000	300				
	incubation box	coho	8,600	206				
Fairfax Cr.	incubation box	coho	40,000	480				
Flume Cr.	incubation box	chum	1,000	8				
Goldstream (Shawnigan Lake Boys School)	incubation box	chum	18,400	147				
Goldstream (Amalgamated Conservation Society)	incubation box	coho	37,000	555				
Goldstream (Discovery Elementary School)	incubation box	chum	9,000	72				
Goodspeed R.	incubation box	coho	4,500	54				
Gore Br.	incubation box	coho	12,000	144				
	incubation box	chum	9,500	76				
Granite Cr.	incubation box	chum	24,000	19				
	incubation box	pink	80,000	2,000				
	incubation box	coho	8,600	206				
Hastings Cr.	incubation box	coho	2,000	24				
Hyacinthe Cr.	incubation box	coho	180,000	2,700				
Hyde Cr.	incubation box	chum	12,000	96				
Hyde Cr./Yule Cr.	incubation box	coho	7,000	84				
Inch Cr.	incubation box	chum	1,250	10				
Kitty Coleman Cr.	incubation box	chinook	70,200	2,106				
	incubation box	coho	21,000	504				
Klemtu Cr.	incubation box	chum	2,000	16				
Kloiya Cr.	incubation box	chinook	4,700	93				
Lakelse R./ Thornhill Cr.	incubation box	coho	750	9				
Laurentian Cr.	incubation box	coho	3,000	36				
Little Chilliwack Cr.	incubation box	chum	8,000	64				
	incubation box	coho	14,000	168				
Little R.	incubation box	cutthroat	3,200	112				
Lostshoe Cr.	incubation box	coho	69,000	828				
	incubation box	chum	26,000	208				
Marble R.	incubation box	chinook	3,400	67				
	incubation box	coho	498	6				
McKay Cr.	incubation box	coho	20,000	240				
Memekay	incubation box	coho	4,500	54				
Millstone R. System	incubation box	coho	50,000	600				
Morice R.	incubation box	chinook	8,000	144				
Mossom Cr.	incubation box	chum	51,000	408				
Nadu Cr.	incubation box	coho	17,000	204				
Nequiltpaolis Cr.	incubation box	chum	39,000	312				
Nicola R.	incubation box	chinook	2,500	56				
Nicomekl R.	incubation box	coho	3,500	394				
Noble Cr.	incubation box	coho	4,800	58				
Noons Cr.	incubation box	coho	15,800	300				
North Vancouver School District	incubation box	coho	49,000	751				
Pachena R.	incubation box	coho	20	0				
Powrivco R.	incubation box	chum	25,600	205				
	incubation box	coho	8,000	96				

Table 5: Juvenile Fish Production from SEP Facilities[*] in 1982 and Adult Production at Design Capacity

Project	Type	Species	Juveniles Released	Expected[12] Adult Production	Contribution to Fisheries	Years of Return to Fishery	AT DESIGN CAPACITY	
							Adult Production	Catch[11]
Puntledge	incubation box	cutthroat	2,000	70				
Reay Cr.	incubation box	coho	2,000	30				
Richards Cr.	incubation box	coho	24,500	312				
Roberts Cr.	incubation box	cutthroat	500	18				
Roy Cr.	incubation box	coho	20,000	240				
Salmon R.	incubation box	coho	4,000	48				
Serpentine Fen	incubation box	coho	2,500	30				
Sewell Inlet	incubation box	chum	25,000	200				
Shawnigan Cr.	incubation box	coho	1,200	14				
Shuswap R.	incubation box	chinook	4,275	85				
	incubation box	coho	2,500	38				
Silverdale Cr.	incubation box	chum	9,000	72				
Soames Cr.	incubation box	chum	11,400	91				
Somass R.	incubation box	coho	64,350	772				
Sooke R.	incubation box	coho	271,886	4,078				
	incubation box	chinook	38,038	913				
Terminal Cr.	incubation box	coho	23,000	345				
Thornhill Cr.	incubation box	coho	125,000	2,550				
Tod Cr.	incubation box	coho	2,000	30				
Tranquille Cr.	incubation box	coho	1,500	18				
Trent	incubation box	coho	65,000	780				
Upper Bulkley	incubation box	chinook	39,000	702				
Upper Paradise	incubation box	chum	24,800	198				
West Vancouver Schools	incubation box	coho	40,500	486				
Yalakom R.	incubation box	coho	30,000	450				
Fishways[9]								
Embley	vertical slot	pink					210,000	122,220
Kakweiken	vertical slot	pink					100,000	62,700
Koksilah	vertical slot	chum					2,000	880
	vertical slot	coho					2,000	1,115
	vertical slot	chinook					500	352
	vertical slot	steelhead					500	250
Reid	steep-pass	pink					2,000	1,164
		chinook					16,000	10,880

Footnotes for Table on Juvenile Fish Production from SEP Facilities in 1982 and Adult Production at Design Capacity.

*Facilities constructed before SEP as well as SEP projects.

[1] Additional releases to land-locked lakes not included.

[2] Planned species with no juvenile release or expected adult production information have not yet undergone production. These species will, however, be included when the project reaches design capacity.

[3] Sachs Creek pilot hatchery releases juvenile pink salmon in the odd year and juvenile coho in the even year.

[4] 1982 juvenile releases are from 1980 brood year stocks. When applied to lake enrichment, "at design capacity" figures refer to the carrying capacity of the lake.

[5] Insufficient sample.

[6] Research facility; no "at design capacity" data.

[7] Juvenile releases are an accumulation of 1981 and 1982 brood years.

[8] It is difficult to estimate "design capacity" due to the continually evolving nature of these projects.

[9] "At design capacity" when applied to fishways, refers to what the river will produce as a result of the fishway. Adult production is from the EPIC database; catch is calculated using production model standards; and 1982 juvenile release and expected adult production are unavailable.

[10] No 1982 chinook and coho releases due to 100% mortality from water problems.

[11] Catch "at design capacity" includes sport, commercial and native food fish catches.

[12] Survival rates vary as they are dependent upon the size of the released juveniles and the enhancement technology (ie. released as fry or smolt, rearing times, and feeding methods).

[13] 4,500 chinook were caught in the False Creek children's fishery of summer 1982 which are counted as adult production.

[14] Pilot facility; no "at design capacity" data.

[15] Pilot facility; production capacity at this site is listed under Kitimat River.

[16] Design capacity figures are unavailable.

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